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PREPARATIONS FOR THE UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT ON THE BASIS OF GENERAL ASSEMBLY RESOLUTION 44/228 AND TAKING INTO ACCOUNT OTHER RELEVANT GENERAL ASSEMBLY RESOLUTIONS: CROSS-SECTORAL ISSUES

ENVIRONMENTALLY SOUND MANAGEMENT OF WASTES, PARTICULARLY HAZARDOUS WASTES, AND OF TOXIC CHEMICALS, AS WELL AS PREVENTION OF ILLEGAL INTERNATIONAL TRAFFIC IN TOXIC AND DANGEROUS PRODUCTS AND WASTES: ENVIRONMENTALLY SOUND MANAGEMENT OF SOLID WASTES AND SEWAGE-RELATED ISSUES

Environmentally sound management of solid wastes and sewage-related issues

(Section II, chapter 13 of Agenda 21)

Text submitted by the Chairman on the basis of negotiations held on document A/CONF.151/PC/100/Add.25

I. INTRODUCTION

1. The incorporation of the chapter on environmentally sound management of solid wastes within Agenda 21 is in response to General Assembly resolution 44/228, paragraph 3, in which the Assembly affirmed that the Conference should elaborate strategies and measures to halt and reverse the effects of environmental degradation in the context of increased national and international efforts to promote sustainable and environmentally sound development in all countries, and to section I, paragraph 12 (g) of the same resolution, in which the Assembly affirmed that environmentally sound

management of wastes was among the environmental issues of major concern in maintaining the quality of the Earth's environment and especially in achieving environmentally sound and sustainable development in all countries.

2. Programme areas included under the present section and chapter of Agenda 21 are closely related to the following programme areas of other sections of Agenda 21:

(a) Protection of the quality and supply of fresh water resources (sect. II, chap. 10);

(b) Promoting a sustainable pattern of human settlements (sect. I, chap. 6);

(c) Protection of human health conditions (sect. I, chap. 5);

(d) Changing consumption patterns (sect. I, chap. 3).

3. Solid wastes, as defined in this chapter, include all domestic refuse and non-hazardous wastes such as commercial and institutional wastes, street sweepings and construction debris. In some countries the solid wastes management system also handles human wastes such as night-soil, septic tank sludge and sludge from sewage treatment plants. If these wastes manifest hazardous characteristics they should be treated as hazardous wastes.

4. Environmentally sound waste management must go beyond the mere safe disposal or recovery of wastes that are generated and seek to address the root cause of the problem by attempting to change unsustainable patterns of production and consumption. This implies the application of the integrated life cycle management concept which presents a unique opportunity to reconcile development with environmental protection.

5. Accordingly, the framework for requisite action should be founded on a hierarchy of objectives and focused on the four major waste-related programme areas, as follows:

(a) Minimizing wastes;

(b) Maximizing environmentally sound waste reuse and recycling;

(c) Promoting environmentally sound waste disposal and treatment;

(d) Extending waste service coverage.

6. The four programmes are interrelated and mutually supportive and must therefore be integrated in order to provide a comprehensive and environmentally responsive framework for managing municipal solid wastes. The mix and emphasis given to each of the four programme areas will vary according to the local socio-economic and physical conditions, rates of waste generation and waste composition. All sectors of society should participate in all the programme areas.

II. PROGRAMME AREAS

A. Minimizing wastes

Basis for action

7. Unsustainable patterns of production and consumption are increasing the quantities and variety of environmentally persistent wastes at unprecedented rates. The trend could significantly increase the quantities of wastes produced by the end of the century and increase quantities four to fivefold by the year 2025. A preventive waste management approach focused on changes in lifestyles and in production and consumption patterns offers the best chance for reversing current trends.

Objectives

8. The objectives in this area are:

(a) To stabilize or reduce the production of wastes destined for final disposal, over an agreed time-frame, by formulating goals based on waste weight, volume and composition and to induce separation to facilitate waste recycling and reuse;

(b) To strengthen procedures for assessing waste quantity and composition changes for the purpose of formulating operational waste minimization policies utilizing economic or other instruments to induce beneficial modifications of production and consumption patterns.

9. According to the capacities and available resources of their Governments, and with the cooperation of the United Nations and other relevant organizations, as appropriate,

(a) By the year 2000 all industrialized countries ensure sufficient national, regional and international capacity to access, process and monitor waste trend information and implement waste minimization policies;

(b) By the year 2000 all industrialized countries should have in place programmes to stabilize or reduce, if practicable, production of wastes destined for final disposal, including per capita wastes (where this concept applies), at the level prevailing at that date; and developing countries as well should work towards that goal without jeopardizing their development prospects;

(c) By the year 2000 all countries, in particular industrialized countries, should apply programmes to reduce the production of agrochemical wastes.

Activities

(a) Management-related activities

10. Governments should initiate programmes to achieve sustained minimization of waste generation. Non-governmental organizations and consumer groups should be encouraged to participate in such programmes, which could be drawn up with the cooperation of international organizations, where necessary. These programmes should, wherever possible, build upon existing or planned activities and should:

(a) Develop and strengthen national capacities in research and design of environmentally sound technologies, as well as adopt measures to reduce wastes to a minimum;

(b) Provide for incentives to reduce unsustainable patterns of production and consumption;

(c) Develop, where necessary, national plans to minimize waste generation as part of overall national development plans;

(d) Emphasize waste minimization considerations in procurement within the United Nations system.

(b) Data and information

11. Monitoring is a key prerequisite for keeping track of changes in waste quantity and quality and their resultant impact on health and the environment. Governments, with the support of international agencies, should:

(a) Develop and apply methodologies for country-level waste monitoring;

(b) Undertake data gathering and analysis, establish national goals and monitor progress;

(c) Utilize data to assess environmental soundness of national waste policies as a basis for corrective action;

(d) Input information into global information systems.

(c) International and regional cooperation and coordination

12. The United Nations and intergovernmental organizations, with the collaboration of Governments, should help promote waste minimization by facilitating greater exchange of information, know-how and experience. The following is a non-exhaustive list of specific activities that could be undertaken:

(a) Identifying, developing and harmonizing methodologies for waste monitoring and transferring such methodologies to countries;

(b) Identifying and further developing the activities of existing information networks on clean technologies and waste minimization;

(c) Undertaking periodic assessment, collating and analysing country data and reporting systematically, in an appropriate United Nations forum, to the countries concerned;

(d) Reviewing effectiveness of all waste minimization instruments and identifying potential new instruments that could be used and techniques by which they could be made operational at the country level. Guidelines and codes of practice should be developed;

(e) Undertaking research on the social and economic impacts of waste minimization at the consumer level.

Means of implementation

(a) Financial and cost evaluation

13. [It is suggested that industrialized countries invest 1 per cent of the revenues derived from total annual solid wastes and sewage towards waste minimization. At current levels this would amount to about $6.5 billion annually, of which $1.8 billion is required for minimizing municipal solid wastes.]

(b) Scientific and technological means

14. Waste minimization technologies and procedures will need to be identified and widely disseminated. This work should be coordinated by national Governments with the cooperation and collaboration of non-governmental organizations, research institutions and appropriate organizations of the United Nations and could include the following:

(a) Undertaking a continuous review of the effectiveness of all waste minimization instruments and identifying potential new instruments that could be used and techniques by which instruments could be made operational at the country level. Guidelines and codes of practice should be developed;

(b) Promoting waste prevention and minimization as the principal objective of national waste management programmes;

(c) Promoting public education and a range of regulatory and non-regulatory incentives to encourage industry to change product design and reduce industrial process wastes through cleaner production technologies and good housekeeping practices and to encourage industries and consumers to use types of packaging that can be reused, in particular refillable and recyclable packaging;

(d) Execute, in accordance with national capacities, demonstration and pilot programmes to optimize waste minimization instruments;

(e) Establish procedures for adequate transport, storage conservation and management of agricultural products, foodstuffs and other perishable goods in order to reduce loss of these products, which results in the production of solid waste;

(f) Facilitate the transfer of waste reduction technologies to industry, particularly in developing countries and establish concrete national standards for effluents and solid waste, taking into account, inter alia, raw material use and energy consumption.

(c) Human resources development

15. Human resources development for waste minimization not only should be targeted at professionals in the waste management sector but also should seek to obtain the support of citizens and industry. Human resources development programmes must therefore aim to raise consciousness and educate and inform concerned groups. Countries should incorporate within school curricula the principles and practices of preventing and minimizing wastes and material on the environmental impacts of waste.

B. Maximizing environmentally sound waste reuse and recycling

Basis for action

16. The exhaustion of traditional disposal sites, stricter environmental controls governing waste disposal and increasing quantities of more persistent wastes, particularly in industrialized countries, have all contributed to a rapid increase in the cost of waste disposal services. Costs could double or triple by the end of the decade. Some current disposal practices pose a threat to the environment. As the economics of waste disposal services change, waste recycling and resource recovery are becoming increasingly cost-effective. Future waste management programmes should take maximum advantage of resource-efficient approaches to control of wastes. These activities should be carried out in conjunction with public education programmes. It is important that markets for products from reclaimed materials be identified in the development of recycling programmes.

Objectives

17. One objective is to strengthen and increase national waste recycling systems.

18. Another objective is to create a model internal waste recycling programme for waste streams, including paper within the United Nations system.

19. A third objective is to make available information, techniques and appropriate policy instruments to encourage and make operational waste recycling schemes.

20. According to the capacities and available resources of their Governments, and with the cooperation of the United Nations and other relevant organizations, as appropriate,

(a) By the year 2000 countries should promote sufficient financial and technological capacities at the regional, national and local levels, as appropriate, to implement waste recycling policies and actions;

(b) By the year 2000 all industrialized countries and by the year 2010 all developing countries should have a national programme, including to the extent possible targets for efficient waste recycling.

Activities

(a) Management-related activities:

21. National Governments and institutions and non-governmental organizations, together with consumer, women's and youth groups, in collaboration with appropriate organizations of the United Nations, should launch programmes to demonstrate and make operational enhanced waste reuse and recycling. These programmes should, wherever possible, build upon existing or planned activities and should:

(a) Develop and strengthen national capacity to reuse and recycle an increasing proportion of wastes;

(b) Review and reform national waste policies to provide incentives for waste recycling;

(c) Develop and implement national plans for waste management that take advantage of, and give priority to, waste recycling;

(d) Modify existing standards or purchase specifications to avoid discrimination against recycled materials, taking into account the saving in energy and raw materials;

(e) Develop public education and awareness programmes to promote the use of recycled products.

(b) Data and information

22. Information and research is required to identify promising socially acceptable and cost-effective forms of waste reuse and recycling relevant to each country. For example, supporting activities undertaken by national and local government in collaboration with the United Nations and other international organizations could include:

(a) Undertaking an extensive review of options and techniques for reuse and recycling all forms of municipal solid wastes. Policies for reuse and recycling should be made an integral component of national and local waste management programmes;

(b) Assessing the extent and practice of waste reuse and recycling operations currently undertaken and identifying ways by which these could be increased and supported;

(c) Increasing funding for research pilot programmes to test various options for reuse and recycling, including the use of small-scale, cottage-based recycling industries; compost production; treated waste-water irrigation; and energy recovery from wastes;

(d) Producing guidelines and best practices for waste reuse and recycling;

(e) Intensifying efforts, at collecting, analysing and disseminating, to key target groups, relevant information on waste issues. Special research grants could be made available on a competitive basis for innovative research projects on recycling techniques;

(f) Identifying potential markets for recycled products.

(c) International and regional cooperation and coordination

23. The international support agencies in general and appropriate United Nations organizations in particular should cooperate with Governments in generating the necessary information and providing the necessary stimulus for encouraging waste reuse and recycling in countries. In particular, the international community should:

(a) Undertake in cooperation with national Governments a periodic review of the extent to which countries reuse and recycle their wastes;

(b) Review the effectiveness of techniques for and approaches to waste recycling and ways of enhancing their application in countries;

(c) Review and update international guidelines for the safe reuse of wastes;

(d) Establish, appropriate programmes to support the small communities' waste recycling industries in developing countries.

Means of implementation

(a) Financial and cost evaluation

24. [If all countries devoted 1 per cent of waste-related municipal revenues to safe waste reuse schemes at current rates those revenues would constitute annual worldwide expenditures of about $8 billion, of which $2.3 billion would be required exclusively for reutilizing solid wastes. It is proposed that the international community direct $0.85 billion to accelerate safe waste reuse in developing countries, of which $0.25 billion relates to solid wastes.]

25. [It is proposed that funding be increased to international organizations to enable them to support these efforts by about $5 million annually. Half of this amount relates to solid wastes.]

(b) Scientific and technological means

26. The transfer of technology should support waste recycling and reuse by the following means:

(a) Including the transfer of recycling technologies, such as machinery for reusing plastics, within bilateral and multilateral technical cooperation and aid programmes;

(b) Developing and improving existing technologies, especially indigenous technologies, and facilitating their transfer under ongoing regional and interregional technical assistance programmes;

(c) Facilitating the transfer of waste reuse and recycling technology.

27. Incentives for waste recycling are numerous. Countries could consider the following options to encourage industry, institutions, commercial establishments and individuals to recycle wastes instead of disposing of them:

(a) Offering incentives to local and municipal authorities that recycle the maximum proportion of their wastes;

(b) Providing technical assistance to informal waste recycling operations;

(c) Applying economic and regulatory instruments, including tax incentives, to support the principle that generators of wastes pay for their disposal;

(d) Providing legal and economic conditions conducive to investments in waste recycling;

(e) Implementing specific mechanisms such as deposit/refund systems as incentives for recycling;

(f) Promoting the separate collection of recyclable parts of household wastes;

(g) Providing incentives to improve the marketability of technically recyclable waste;

(h) Encouraging the use of recyclable materials, particularly in packaging, where feasible;

(i) Encouraging the development of markets for recycled goods by establishing programmes.

(c) Human resources development

28. Training will be required to reorient current waste management practices to include waste reuse and recycling. Governments, in collaboration with United Nations international and regional organizations, should undertake the following indicative list of actions:

(a) Including waste recycling in in-service training programmes as integral components of technical cooperation programmes on urban management and infrastructure development;

(b) Expanding training programmes on water supply and sanitation to incorporate techniques and policies for waste reuse and recycling;

(c) Including the advantages and civic obligations associated with waste recycling in school curricula and relevant general educational courses;

(d) Encouraging non-governmental organizations, community-based organizations and women's, youth and public interest group programmes, in collaboration with local municipal authorities, to mobilize community support for waste recycling through focused community-level campaigns.

(d) Capacity-building

29. Capacity-building to support increased waste recycling should focus on the following areas:

(a) Making operational national policies and incentives for waste management;

(b) Enabling local and municipal authorities to mobilize community support for waste recycling by involving and assisting informal sector waste recycling operations and undertaking waste management planning that incorporates resource recovery practices.

C. Promoting environmentally sound waste disposal and treatment

Basis for action

30. Even when wastes are minimized, some wastes will still remain. Even after treatment, all discharges of wastes have some residual impact on the receiving environment. Consequently, there is scope for improving waste treatment and disposal practices such as, for example, avoiding the discharge of sludges at sea. In developing countries the problem is of a more fundamental nature: less than 10 per cent of urban wastes receive some form of treatment and only a small proportion of treatment is in compliance with any acceptable quality standard. Faecal matter treatment and disposal should be accorded due priority given the potential threat of faeces to human health.

Objectives

31. The objective in this area is to treat and dispose safely of a progressively increasing proportion of the generated wastes.

32. According to the capacities and available resources of their Governments and with the cooperation of the United Nations and other relevant organizations, as appropriate,

(a) By the year 2000 all countries should establish waste treatment and disposal quality criteria, objectives and standards based on the nature and assimilative capacity of the receiving environment;

(b) By the year 2000 countries should establish sufficient capacity to undertake waste-related pollution impact monitoring and conduct regular surveillance [including epidemiological surveillance];

(c) By the year 1995 industrialized countries and by the year 2005 developing countries should ensure that at least 50 per cent of all sewage, waste waters and solid wastes are treated or disposed of in conformity with national or international environmental and health quality guidelines;

(d) By the year 2025 countries should dispose of all sewage, waste waters and solid wastes in conformity with national or internatinal environmental quality guidelines.

Activities

(a) Management-related

33. National Governments and institutions and non-governmental organizations together with industries, in collaboration with appropriate organizations of the United Nations, should launch programmes in all parts of the world to improve the control and management of waste-related pollution. These programmes should, wherever possible, build upon existing or planned activities and should:

(a) Develop and strengthen national capacity to treat and safely dispose of wastes;

(b) Review and reform national waste management policies to gain control over waste-related pollution;

(c) Encourage countries to seek waste disposal solutions within their sovereign territory and as close as possible to the sources of origin that are compatible with environmentally sound and efficient management. In a number of countries, transboundary movements take place to ensure that wastes are managed in an environmentally sound and efficient way. Such movements observe the relevant conventions including those that apply to areas that are not under national jurisdiction;

(d) Develop human wastes management plans giving due attention to the development and application of appropriate technologies and the availability of resources for implementation.

(b) Data and information

34. Standard setting and monitoring are two key elements essential for gaining control over waste-related pollution. The following specific activities are indicative of the kind of supportive actions that could be taken by international agencies such as the United Nations Centre for Human Settlements (Habitat), the United Nations Environment Programme and the World Health Organization:

(a) Assembling and analysing the scientific evidence and pollution impacts of wastes in the environment in order to formulate and disseminate recommended scientific criteria and guidelines for environmentally sound management of solid wastes;

(b) Recommending national and, where relevant, local environmental quality standards based on scientific criteria and guidelines;

(c) Including within technical cooperation programmes and agreements the provision for monitoring equipment and for the requisite training in its use;

(d) Establishing an information clearing-house with extensive networks at the regional, national and local levels to collect and disseminate information on all aspects of waste management, including safe disposal.

(c) International and regional cooperation and coordination

35. The international community, as a whole, and especially appropriate United Nations organizations such as the United Nations Centre for Human Settlements (Habitat), the United Nations Environment Programme, the World Health Organization and the United Nations Industrial Development Organization and professional associations should generate the necessary information and provide the necessary stimulus for encouraging the treatment and safe disposal of wastes in all countries. In particular, the international community should:

(a) Identify, develop and harmonize methodologies and environmental quality and health guidelines for safe waste discharge and disposal;

(b) Review and keep abreast of developments and disseminate information on the effectiveness of techniques and approaches to safe waste disposal and ways of supporting their application in countries.

Means of implementation

(a) Financial and cost evaluation

36. [Safe waste disposal programmes are relevant to both developed and developing countries. In developed countries the focus is on improving facilities to meet higher environmental quality criteria, while in developing countries considerable investment is required to build new treatment facilities.]

37. [Safe waste disposal programmes require a total annual investment in developing countries of $15.1 billion, of which $2.7 billion is required exclusively for the safe disposal of solid wastes. If the international community provided one third of this amount, about $3.4 billion annually would be required, of which about $1 billion relates to solid wastes.]

38. [About $5 million annually would be required to strengthen the capacity of international organizations to support these efforts. Half of this amount relates to solid wastes.]

(b) Scientific and technological means

39. Scientific guidelines and research on various aspects of waste-related pollution control will be crucial for achieving the objectives of this programme. Governments, municipalities and local authorities with appropriate international cooperation should:

(a) Prepare guidelines and technical reports on subjects such as the integration of land use planning in human settlements with waste disposal, environmental quality criteria and standards, waste treatment and safe disposal options, industrial waste treatment and landfill operations;

(b) Undertake research on critical subjects such as low-cost, low-maintenance waste-water treatment systems; safe sludge disposal options; industrial waste treatment; and low-technology, ecologically safe waste disposal options;

(c) Transfer technologies on industrial waste treatment processes through transnational corporations and bilateral and multilateral technical cooperation programmes;

(d) Focus on the rehabilitation, operation and maintenance of existing facilities and technical assistance on improved maintenance practices and techniques followed by the planning and construction of waste treatment facilities;

(e) Establish programmes to maximize the source segregation and safe disposal of the hazardous components of municipal solid waste;

(f) Ensure the investment and provision of waste collection facilities with the concomitant provision of water services and with an equal and parallel investment and provision of waste treatment facilities.

(c) Human resources development

40. Training would be required to improve current waste management practices to include safe collection and waste disposal. The following is an indicative list of actions that should be undertaken by Governments in collaboration with international agencies:

(a) Provision of both formal and in-service training focused on pollution control, waste treatment and disposal technologies, and operation and maintenance of waste-related infrastructure. Intercountry staff exchange programmes should also be established;

(b) Undertaking of the requisite training for waste-related pollution monitoring and control enforcement.

(d) Capacity-building

41. Institutional reforms and capacity-building will be indispensable if countries are to be able to quantify and mitigate waste-related pollution. Activities to achieve this objective should include:

(a) Creation and strengthening of independent environmental control bodies at national and local levels. International organizations and donors should support needed upgrading of manpower skills and provision of equipment;

(b) Empowering of pollution control agencies with the requisite legal mandate and financial capacities to carry out their duties effectively.

D. Extending waste service coverage

Basis for action

42. By the end of the century over 2.0 billion people will be without access to basic sanitation, and an estimated half of the urban population in developing countries will be without adequate solid waste disposal services. As many as 5.2 million people, including 4 million children under five years of age, die each year from waste-related diseases. The health impacts are particularly severe for the urban poor. The health and environmental impacts of inadequate waste management, however, go beyond the unserved settlements themselves and result in water, land and air contamination and pollution over a wider area. Extending and improving waste collection and safe disposal services are crucial to gaining control over this form of pollution.

Objectives

43. The overall objective of this programme is to provide health-protecting, environmentally safe waste collection and disposal services to all people. According to the capacities and available resources of their Governments and with the cooperation of the United Nations and other relevant organizations, as appropriate, should ensure that:

(a) By the year 2000 all countries have the necessary technical, financial and human resource capacity to provide waste collection services commensurate with needs;

(b) By the year 2025 all urban populations are provided with adequate waste services;

(c) By the year 2050 full urban waste service coverage is maintained and full rural coverage with sanitation achieved in all rural areas.

Activities

(a) Management-related

44. Governments, according to their capacities and available resources and with the cooperation of the United Nations and other relevant organizations, as appropriate, should:

(a) Establish financing mechanisms for waste management service development in deprived areas including appropriate modes of revenue generation;

(b) Apply the "polluter pays" principle where appropriate by setting waste management charges at rates that reflect the costs of providing the service and ensure that those who generate the wastes pay the full cost of disposal in an environmentally safe way;

(c) Encourage institutionalization of communities' participation in planning and implementation procedures for solid waste management.

(b) Data and information

45. Governments in collaboration with the United Nations and international agencies should undertake:

(a) To develop and apply methodologies for waste monitoring;

(b) To assume responsibility for data gathering and analysis in order to establish goals and monitor progress;

(c) To input information into a global information system building upon existing systems;

(d) To strengthen the activities of existing information networks in order to disseminate focused information on the application of innovative and low-cost alternatives for waste disposal to targeted audiences.

(c) International and regional cooperation and coordination

46. Many United Nations and bilateral programmes exist that seek to provide water supply and sanitation services to the unserved. The Water and Sanitation Collaborative Council, a global forum; currently acts to coordinate development and encourage cooperation. Even so, given the ever-increasing numbers of unserved urban poor populations and the need to address, in addition, the problem of solid waste disposal, additional mechanisms are essential to ensure accelerated coverage of urban waste disposal services. The international community in general and selected United Nations organizations in particular should:

(a) Launch a settlement infrastructure and environment programme following the United Nations Conference on Environment and Development to coordinate the activities of all agencies of the United Nations system involved in this area and include a clearing-house for information dissemination on all waste management issues;

(b) Undertake and systematically report on progress in providing waste services to those without;

(c) Review effectiveness of techniques for and approaches to increasing coverage and identify innovative ways of accelerating the process.

Means of implementation

(a) Financial and cost evaluation

47. [Extending waste service coverage to unserved populations is relevant mainly to developing countries. A total annual investment for extending waste service coverage in accordance with the schedule indicated in programme objectives is estimated at $7.5 billion of which $1.6 billion pertains to solid waste service expansion. Assuming one third of these costs was financed by the international community, the concessional assistance requirements would be about $2.6 billion, of which $0.6 billion relates to solid wastes services.]

48. [About $8 million annually will be needed to strengthen the capacity of international organizations to support these efforts. Half of this amount relates to solid wastes.]

(b) Scientific and technological means

49. National Governments and institutions, together with non-governmental organizations, should, in collaboration with appropriate organizations of the United Nations, launch programmes in different parts of the developing world to extend waste services to the unserved populations. These programmes should, wherever possible, build upon and reorient existing or planned activities.

50. Policy changes at the national and local levels could enhance the rate of waste service coverage extension. These changes should include the following:

(a) Giving full recognition to and using the full range of low-cost options for waste management including, where appropriate, their institutionalization and incorporation within codes of practice and regulation;

(b) Assigning high priority to the extension of waste management services, as necessary and appropriate, to all settlements irrespective of their legal status giving due emphasis to meeting the waste disposal needs of the unserved, especially the unserved urban poor;

(c) Integrating the provision and maintenance of waste management services with other basic services such as water-supply and storm-water drainage.

51. Research activities could be enhanced. Countries, in cooperation with appropriate international organizations and non-governmental organizations should, for instance:

(a) Find solutions and equipment for managing wastes in areas of concentrated populations. In particular, there is a need for appropriate refuse storage and collection systems and cost-effective and hygienic human waste disposal options;

(b) Prepare and disseminate guidelines, case-studies, policy reviews and technical reports on appropriate solutions and modes of service delivery to unserved low-income areas;

(c) Launch campaigns to encourage active community participation involving women's and youth groups in management of waste, particularly household waste;

(d) Promote intercountry transfer of relevant technologies, especially technologies for high-density settlements.

(c) Human resources development

52. International organizations and national and local Governments, in collaboration with non-governmental organizations, should provide focused training on low-cost waste collection and disposal options, particularly techniques for their planning and delivery. Intercountry staff exchange programmes among developing countries could form part of such training. Particular attention should be given to upgrading the status and skills of management-level personnel in waste management agencies.

53. Improvements in management techniques are likely to yield the greatest returns in terms of improving waste management service efficiency. The United Nations, international organizations and financial institutions should, in collaboration with national and local Governments, develop and render

operational management information systems (MIS) for municipal record keeping and accounting and for efficiency and effectiveness assessment.

(d) Capacity-building

54. National Governments and institutions and non-governmental organizations, with the collaboration of appropriate organizations of the United Nations, should develop capacities to implement programmes to provide waste collection and disposal services to the unserved populations. Some activities under the programmes should include the following:

(a) Establishing a special unit within current institutional arrangements to plan and deliver services to the unserved poor communities with their involvement and participation;

(b) Making revisions to existing codes and regulations to permit the use of the full range of low-cost alternative technologies for waste disposal.

(c) Building institutional capacity and developing procedures for undertaking service planning and delivery.